1/6/16 "A mistake is food for a new invention." -Anonymous

HW: "Domain and Range" w/s Section II #4, 7, 8 Section IV #1, 7
Test 3 on Thursday 1/21

AIM: What are the domain and range of functions?

Warm Up:

The roots of the equation $ax^2 + 4x = -2$ are real, rational, and equal when a has a value of

(1) 1
(2) 2
(3) 3
(4) 4

$+2 \quad +2$

$ax^2 + 4x + 2 = 0$

$b^2 - 4ac = 0$

$4^2 - 4(a)(2) = 0$

$16 - 8a = 0$

$-16 \quad -16$

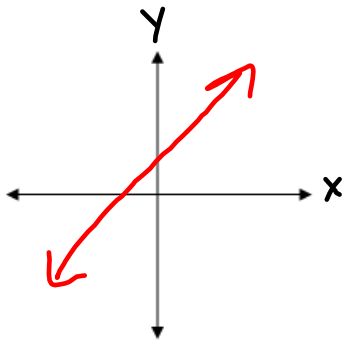
$\frac{-8a}{-8} = \frac{-16}{-8}$

$a = 2$

Domain of a function: (Input) The x-values

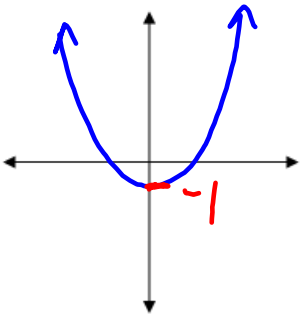
Range of a function: (Output) The y-values

I. Let's look at some graphs and state the domain and range of each function:



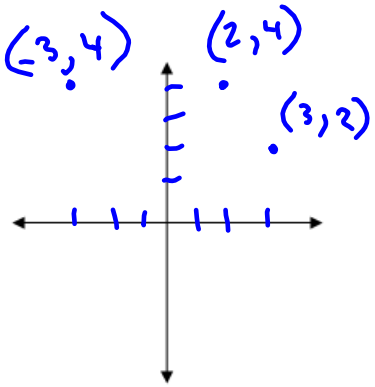
Domain: $(-\infty, \infty)$ or $x \in \mathbb{R}$ or All Real #s

Range: $(-\infty, \infty)$ or $y \in \mathbb{R}$ or All real #s



D: All Real #s

R: $[-1, \infty)$ or $y \geq -1$



D: $\{-3, 2, 3\}$

R: $\{2, 4\}$

3 Specific Situations where Domain has restrictions,

1) Fractions: Denominator $\neq 0$

2) Radicals: Radicals can't have negatives under the $\sqrt{\ }$

3) Radical in the denominator:

$\sqrt{\ }$ can't be negative or 0 under $\sqrt{\ }$

II. Find the **domain** of each

1. $y = \frac{1}{x-3}$

$x - 3 \neq 0$
$+3 \quad +3$
$x \neq 3$

All Real #s except 3
or
$x \neq 3$

2. $y = \frac{5}{x^2-4}$

$x^2 - 4 \neq 0$
$(x-2)(x+2)$
$x \neq 2 \mid x \neq -2$

Domain: $x \neq \pm 2$
or
All real #s except 2, -2
or
$(-\infty, -2) \cup (-2, 2) \cup (2, \infty)$

5. $y = \sqrt{x-5}$

$x - 5 \geq 0$
$+5 \quad +5$
$x \geq 5$

D: $x \geq 5$
or
$[5, \infty)$

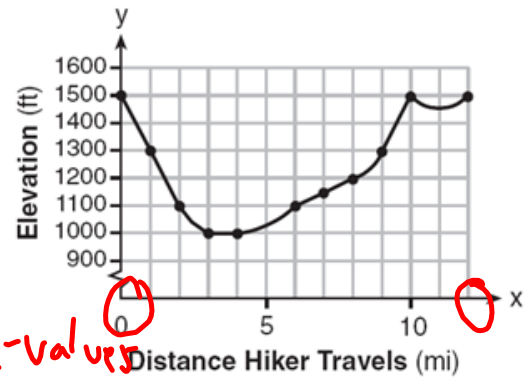
6. $y = \frac{5}{\sqrt{x-3}}$

$x - 3 > 0$
$+3 \quad +3$
$x > 3$

D: $x > 3$
or
$(3, \infty)$

III.

1) The accompanying graph shows the elevation of a certain region in New York State as a hiker travels along a trail.



X-values

What is the domain of this function?

(1) $1{,}000 \le x \le 1{,}500$

~~(2) $1{,}000 \le y \le 1{,}500$~~

(3) $0 \le x \le 12$

~~(4) $0 \le y \le 12$~~